DOCUMENT RESUME

ED 275 093 EC 190 617

AUTHOR Drash, Philip W.; And Others
TITLE Three Procedures for Increasing Vocal Response to Prompt and Initial Imitation in Down Syndrome Children: A Comparison.
PUB DATE May 86
NOTE 20p.; Paper presented at the Annual Meeting of the American Association on Mental Deficiency (110th, Denver, CO, May 25-29, 1986).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Child Language; Contingency Management; *Delayed Speech; *Downs Syndrome; *Imitation; Infants; *Language Acquisition; Negative Reinforcement; *Operant Conditioning; *Positive Reinforcement; Prompting; Social Reinforcement; Verbal Stimuli; Young Children

ABSTRACT

The study sought to identify effective procedures for facilitating initial imitative vocal behavior in mentally retarded children, thus accelerating the initial stages of language acquisition. Three groups of Down syndrome children ages 6 months to 4 years (N=15) served as subjects in an examination of the relative effectiveness of three procedures for increasing vocal response to experimenter prompt: (1) positive reinforcement only; (2) light-out (room lights dimmed) combined with positive reinforcement; (3) visual screening (silk handkerchief placed across the face) combined with positive reinforcement. No more than three prompts were delivered under the screen for light-out and visual screening conditions, and a response to prompt removed the screen. Results showed that light-out and visual screening were equally effective in increasing the frequency of vocalizations to the therapist's prompt, and that both were significantly more effective than positive reinforcement alone. A clear advantage of light-out and visual screening was a rapid increase in the percentage response to prompt observed between baseline and the first 40 minutes of training. Combining positive social reinforcement for responses with light-out or visual screening for nonresponses increased the probability of vocalization. (JW)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
☒ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

ED275093

Three Procedures for Increasing Vocal Response to Prompt and Initial Imitation in Down Syndrome Children: A Comparison

Philip W. Drash, Sharon A. Raver-Lampman and Mary R. Murrin

Florida Mental Health Institute
University of South Florida

For Information, write:

Philip W. Drash, Ph.D.
Florida Mental Health Institute
University of South Florida
13301 North 30th Street
Tampa, Florida 33612
(813) 974-4522

Presented at:

American Association on Mental Deficiency
110th Annual Meeting
Denver, Colorado
May 25 - 29, 1986

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
Philip W. Drash
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

ED 159 017

Running Head: INCREASING VOCAL RESPONSE RATE

Three Procedures for

Increasing Vocal Response to Prompt

and Initial Imitation in Down Syndrome Children: A Comparison

Acquisition of speech has been identified as a critical first step in improving cognitive functioning of retarded children (Flavell, 1977; Kahn, 1983; Leonard, 1978; Vygotsky, 1962). Communication deficiencies are recognized as among the most debilitating limitations of the retarded (Jordan, 1967; Kahn, 1977). Language acquisition among Down infants is often severely delayed and some Down children do not acquire speech until 8 years of age (Dicks-Mireaux, 1972; Greenwald & Leonard, 1979; Smith & Wilson, 1973). There is a critical need to develop procedures which will accelerate the initial stages of language acquisition in Down syndrome infants and thus facilitate their intellectual development.

Operant procedures have been successfully used to increase speech in nonverbal and verbally delayed children, including the autistic and the moderately retarded (Bricker, 1980, 1983; Drash & Leibowitz, 1973; Garcia, 1984; Garcia & DeHaven, 1974; Howlin, 1981; Lovaas, 1976, 1977; Schiefelbusch, 1974, 1978). Behavioral programs can also accelerate language development of some Down syndrome children (Clunies-Ross, 1979; Drash, 1982; Hayden & Dimitriev, 1975; Hayden & Haring, 1977; Salzberg & Villani, 1983; Weller and Mahoney, 1983; Willems, Lombardino, McDonald, & Owens, 1982).

Despite the success of some behavioral programs with Down children, the majority of Down infants do not acquire their first words until 2 or 3 years of age (Dicks-Mireaux, 1972). One of the most difficult steps in language acquisition

with verbally delayed children is producing initial imitation (Carr, 1979; Drash & Leibowitz, 1973; Lovaas, 1977), Down syndrome children are also delayed in the development of vocal imitation even when compared to nondelayed children matched for mental age (Mahoney, Glover, and Finger, 1981). Due to the lack of responsivity of many Down infants (Koch & de la Cruz, 1975), problems in establishing initial imitative control are greatly compounded. Positive reinforcement, including vocal praise, touching, jostling, and food have been used to establish imitation in infants and children (Bricker, 1983; Drash, 1983; Lovaas, 1976). While standard reinforcement procedures are often effective, none have been consistently reliable in increasing initial vocal response to therapist prompt and initial imitation of sounds and words (Carr, 1979).

A technique for increasing initial vocal rate in nonverbal retarded children which has been experimentally demonstrated to be more effective that positive reinforcement alone is a light-out technique reported by Drash (Drash, Murrin, Jordan, & Clark, 1985; Singer, Pasnak, Drash, & Baer, 1978).

Another procedure which has not been evaluated experimentally is visual screening. This procedure has been tested in a clinical setting and appears effective in accelerating the vocal rate of Down syndrome infants.

Research Objectives

This study had two major research objectives: first, to compare the relative effectiveness of three procedures for increasing vocal response to experimenter prompt, namely, (1) positive reinforcement only, (2) light-out combined with positive reinforcement, and (3) visual screening combined with positive reinforcement. The second objective of this study was to determine whether the visual screening

technique, combined with positive reinforcement, would reliably increase vocal response to prompt and initial imitation by Down syndrome infants and children.

Method

Subjects

Subjects of this study were fifteen Down syndrome infants between the ages of 6 months and 4 years. Subjects were the children of parent volunteers, most of whom are members of local support groups for parents of Down syndrome infants.

Procedure (Approved by USF Human Subjects Review Committee)

Subjects were matched for age and were randomly assigned to one of three experimental groups. All infants were evaluated using the Cattell Infant Intelligence Scale or the Revised Stanford Binet Intelligence Scale before the experimental sessions begin. Language level was assessed by the REEL and EPB Scales. Mental ages ranged from 6 to 34 months, and language ages ranged from 5 to 26 months.

Group One: Positive reinforcement only. A vocal response by the Down infant within 5 seconds of the experimenter's prompt was followed immediately by positive reinforcement in the form of vocal praise, caressing, jostling, or presentation of a toy.

Group Two: Light-out combined with positive reinforcement. A vocal response by the infant within 5 seconds of the experimenter's prompt was followed immediately by positive reinforcement as above. If no response occurred within five seconds of the prompt, room lights were dimmed for a maximum of 15 seconds while 3 additional prompts were delivered. A response to prompt during light-out was immediately consequated by turning on the room lights.

Group Three: Visual screening combined with positive reinforcement. A vocal response by the infant within 5 seconds of the experimenter's vocal prompt was followed immediately by positive reinforcement as above. If no response occurred within five seconds of the prompt, a silk handkerchief was placed across the infant's face. As soon as the infant vocalized to the therapist's prompt, the cloth was removed immediately and the child was given positive reinforcement as in conditions one and two above. As in light-out, no more than three prompts were delivered under the screen, and a response to prompt removed the screen.

Design of the Study and Data Analysis

The experiment was divided into a baseline and a treatment condition. Baseline consisted of 5 sessions of 10 minutes each during which the experimenter presented a vocal prompt to the infant and recorded whether the infant responded with a vocalization to the prompt within 5 seconds and whether the response was a correct imitation. No reinforcement was provided for responding during baseline.

The treatment condition consisted of 8 sessions of 30 minutes each for each subject under the age of two, and 6 sessions of 40 minutes for each of the older subjects (a total of 24 ten minute sessions). An experimental protocol provided instructions to research assistants on how to conduct each session and how to record data.

Dependent measures were: (1) percentage of response to prompt. (2) number of correct imitations (3) number of nonresponses. A two-way mixed ANOVA was conducted on all dependent measures. The between groups factor was the three treatment conditions and the repeated measures factor was the baseline and 6 blocks of 4 ten minute sessions.

During each session, the number of prompts delivered, the number of vocalizations and the number of correct imitations were counted on a manual six-place counter. The number of nonresponses was obtained by subtracting the number of vocalizations plus imitations from the number of prompts. The six-place counter enabled us to count these four measures separately when light-out or visual screen trials were administered. All sessions were audio recorded in order to conduct reliability checks. The mean reliability (frequency ratios) for prompts, responses, and nonresponses ranged from 93 to 96 percent. The 29 sessions were combined in the following manner. The first point is the average of the five baseline sessions. The next six points are each averages of four training sessions.

Results

****

Figure 1: Percent Response to Therapist Prompt

****

Figure 1 shows the change in percent of responses to therapist prompts (responses / prompts x 100) for each of the three groups over the course of the study. As shown in Figure 1, both the light-out and the visual screening procedure were significantly more effective than positive reinforcement alone in increasing percent response to therapist prompt. Moreover, there were no significant differences between the light-out and the screening groups. In both light-out and the screening conditions, percent response to prompt reached 80 percent and never fell below 60 percent, while in the positive reinforcement alone condition, percent response to prompt never reached 60 percent. There was also a large significant increase in percentage response to prompt from nonreinforcement baseline to the first

training block for all three groups, as well as a significant increase in percent response to prompt across training.

****

Figure 2: Percent of Nonresponses

****

Figure 2 indicates the average percent of nonresponses (prompts minus responses) to therapist prompt per session. This measure can be operationally defined as the percent of off-task behavior. As can be seen, there was a significant decrease in off-task behavior from baseline to training in all three groups and a further decline over the course of training. Of most interest from a therapeutic standpoint is the fact that both special procedure groups had significantly fewer off-task episodes than the positive reinforcement only group during training. Moreover these two groups did not differ from each other. Percent of off-task responses for the light out and the screening group varied between 15 and 30 percent, while the percent of off-task behavior for the positive reinforcement group was as high as 50 to 60 percent.

****

Figure 3: Number of Nonresponses

****

Figure 3 presents the same data from the standpoint of the absolute number of nonresponses and indicates that the number of nonresponses or off-task episodes was significantly higher under the positive reinforcement only condition.

****

Figure 4: Number of Prompts Delivered

****

Figure 4 indicates the average number of prompts delivered per session

by the therapist during each of the three conditions was approximately equal. The presentation rate for each of the three conditions was about 6 to 7 prompts per minute. This suggests that the difference in number of responses to prompt shown in Figure 1 was probably a function of reinforcement contingencies, rather than a function of differential rate of stimulus presentation.

****

Figure 5: Number of Imitations

****

Figure 5 shows the results for the average number of imitations counted per session. Although an increase in vocal imitation was not a specific goal of the study, the magnitude of social reinforcement tended to be proportional to the quality of the child's utterance (quality was a subjective therapist evaluation based on subject's current language skills). Thus some change in vocal imitation might be expected. There was, in fact, a significant increase for all three groups during training. Despite the appearance of the data, there were no significant differneces between groups. There were no significant differences between baseline and training block 1 and no significant differences between baseline and training block 1 and no significant differences between training blocks 2-6. Thus the major increase was from training block 1 to training block 2. This lends credibility to our hypothesis that increasing frequency of vocalization to prompt, which increased most from baseline to block 1, would lead to increased levels of imitation, which occurred in the next training block.

Discussion

This study indicates that both light-out and visual screening were more

effective than positive reinforcement alone in increasing the frequency of vocalizations to the therapist's prompt, and both light-out and visual screening were equally effective. Although social reinforcement alone appears to be effective when compared to the baseline period of nonreinforcement, combining positive social reinforcement for responses with light-out or visual screening for nonresponses leads to increase in the probability that the child will vocalize to the therapist's prompt.

One clear advantage of light-out and visual screening was a rapid increase in the percentage response to prompt observed between baseline and the first 40 minutes of training. Once subjects in the light-out condition learned that vocalization would terminate the lights, four out of five responded to the first prompt after light-out most of the time. This is consistant with the findings of our two previous studies which found that subjects typically responded to the light-out in 1 or 2 seconds (Drash, Murrin, Jordan & Clark, 1985; Singer, Pasnak, Drash & Baer, 1978). By contrast, children in the visual screening condition typically did not show this pattern of 100% response to prompt under the screening condition. Once a high rate of response was established, there was no difference in rate of increase in percentage response to prompts between the two groups.

This study indicated that light-out and visual screening were equally effective in increasing response to therapist's prompt. Both of these methods are effective in enhancing the efficacy of language training therapy with young Down syndrome children. Both need to be administered equally often in a training session, and both lead to similar increases in overall vocalization to prompt. Despite the fact that the two procedures appear to be equally effective, each has characteristics which may make one more desirable than the other in certain settings. Light-out

is less cumbersome and interferes less with the therapist's procedures, since it is operated by a foot switch. It does, however, require special equipment. By contrast, visual screening does not require any special equipment other than a large handkerchief and does not have the potential psychological disadvantages of light-out.*

Overall, the results of this study indicate the usefulness of the light-out and visual screening techniques to develop a high percentage of vocal response to therapist prompt early in individual language training with young Down syndrome children. Establishing high rates of vocal response to therapist prompt enables the therapist to proceed directly to the next stage of vocal training; that is, vocal imitation. These procedures appear to hold considerable promise for effective implementation with Down syndrome and other language delayed children as a means to facilitate initial imitative vocal behavior, and thus assist in a more rapid development of speech, language and cognitive skills.

*It should be noted that all 15 children were tested with several short episodes to light-out prior to training. Only one child out of fifteen found it aversive, and 2 of 5 children in the light-out condition requested light-out during the session. Both light-out and visual screening were presented as a game which probably served to reduce the potential aversiveness of these procedures.

References

Bricker, D.D. (Ed.) (1980). New Directions for Exceptional Children: Language Intervention. San Francisco: Jossey-Bass.

Bricker, D.D. (1983). Early communication: Development and training. In M. Snell (Ed.), Systematic Instruction of the Moderately and Severely Handicapped. Columbus: Merrill.

Carr, E.G. (1979). Teaching autistic children to use sign language: Some research issues. Journal of Autism and Developmental Disorders, 9, 345-359.

Clunies-Ross, G.G. (1979). Accelerating the development of Down's syndrome infants and young children. Journal of Special Education, 13, 169-177.

Dicks-Mireaux, M.J. (1972). Mental development of infants with Down's syndrome. American Journal of Mental Deficiency, 77, 26-32.

Drash, P.W. (1983). TALK: A systematic behavioral program for increasing speech, language, and intelligence in autistic and nonverbal children. Florida Association for Behavior Analysis Quarterly, 3, 3-4.

Drash, P.W. (1982). Increasing intelligence and speech in Down's syndrome infants: A three to five year follow-up. Down's Syndrome, 5, 2-3.

Drash, P.W. & Leibowitz, J.M. (1973). Operant conditioning of speech and language in the nonverbal retarded child: Recent advances. Pediatric Clinics of North America, 20, 233-243.

Drash, P.W., Murrin, M.R., Jordan, S.E., & Clark, H.B. (1985). Rapid

reduction of off-task behavior in retarded children by use of light-out. Psychological Reports, 56, 499-509.

Flavell, J.H. (1977). Cognitive Development. Englewood Cliffs, NJ: Prentice-Hall.

Garcia, E.E. (1984). Speech and Language Disorders. Garcia, E.E. & DeHaven, E.D. (1974). Use of operant techniques in the establishment and generalization of language: A review and analysis. American Journal of Mental Deficiency, 79, 169-178.

Greenwald, C.A. & Leonard, L.B. (1979). Communicative and sensorimotor development of Down's syndrome children. American Journal of Mental Deficiency, 84, 296-303.

Hayden, A.H., & Dmitrieve, V. (1975). The multidisciplinary preschool program for Down syndrome children at the University of Washington Model Preschool Center. In B.Z. Friedlander, G.M. Sterritt, & G.E. Kirk (Eds.), Exceptional Infant (Vol. 3). Assessment and Intervention. New York: Brunner/Mazel.

Hayden, A.H., & Haring, N.G. (1977). The acceleration and maintenance of developmental gains in Down's syndrome school-age children. In P. Mittler (Ed.), Research to Practice in Mental Retardation (Vol. 1). Care and Intervention. Baltimore: University Park Press.

Howlin, P.A. (1981). The effectiveness of operant language training with autistic children. Journal of Autism and Developmental Disorders, 11, 89-105.

Jordan, T.E. (1967). Language and Mental Retardation: A review of the literature. In R.L. Schiefelbusch, R.H. Copeland, & J.O. Smith (Eds.), Language and Mental Retardation: Empirical and Conceptual Considerations. New York: Holt, Rinehart, & Winston.

Kahn, J.V. (1977). A comparison of manual and oral language training with mute retarded children. Mental Retardation, 15, 21-23.

Kahn, J.V. (1983). Sensorimotor period and adaptive behavior development of severely and profoundly mentally retarded children. American Journal of Mental Deficiency, 88, 69-75.

Koch, R. & de la Cruz, F.F. (Eds.) (1975). Down's Syndrome: Research, Prevention and Management. New York: Brunner/Mazel.

Leonard, L.B. (1978). Cognitive factors in early linguistic development. In R.L. Schiefelbusch (Ed.). Bases of Language Intervention. Baltimore: University Park Press.

Lovaas, O.I. (1976). Language Acquisition Programs for Nonlinguistic Children. New York: Irvington.

Lovaas, O.I. (1977). The Autistic Child: Language Development Through Behavior Modification. New York: Irvington.

Mahoney, G., Glover, A., & Figer, I. (1981). Relationship between language and sensorimotor development of Down syndrome and nonretarded children. American Journal of Mental Deficiency, 86 (1), 21-27.

Salzberg, C.L., & Villani, T.V. (1983). Speech training by parents of Down's syndrome toddlers: Generalization across settings and instructional contexts. American Journal of Mental Deficiency,

87, 403-413.

Schiefelbusch, R.L. (Ed.) (1978). Language Intervention Strategies. Baltimore: University Park Press.

Schiefelbusch, R.L. & Lloyd, L.L. (Eds.) (1974). Language Perspective: Acquisition, Retardation, and Intervention. Baltimore: University Park Press.

Singer, F.L., Pasnak, R., Drash, P.W., & Baer, R. (1978). Rapid reduction of lengthy pausing during vocal responding by nonverbal retarded children. Behavior Therapy, 9, 669-670.

Smith, D.W. & Wilson, A.A. (1973). The Child with Down's Syndrome. Philadelphia: W.B. Saunders.

Vygotsky, L.S. (1962). Thought and Language. Cambridge, MA: MIT Press.

Weller, E.L. and Mahoney, G.J. (1983). A comparison of oral and total communication modalities in the language training of young mentally handicapped children. Education and Training of the Mentally Retarded, 18 (2), 103-110.

Willems, S.G., Lombardino, L.J., McDonald, J.D., & Woens, R.E.(1982). Total communication: Clinical report on a parent-based language training program. Education and Training of the Mentally Retarded, 12, 293-298.

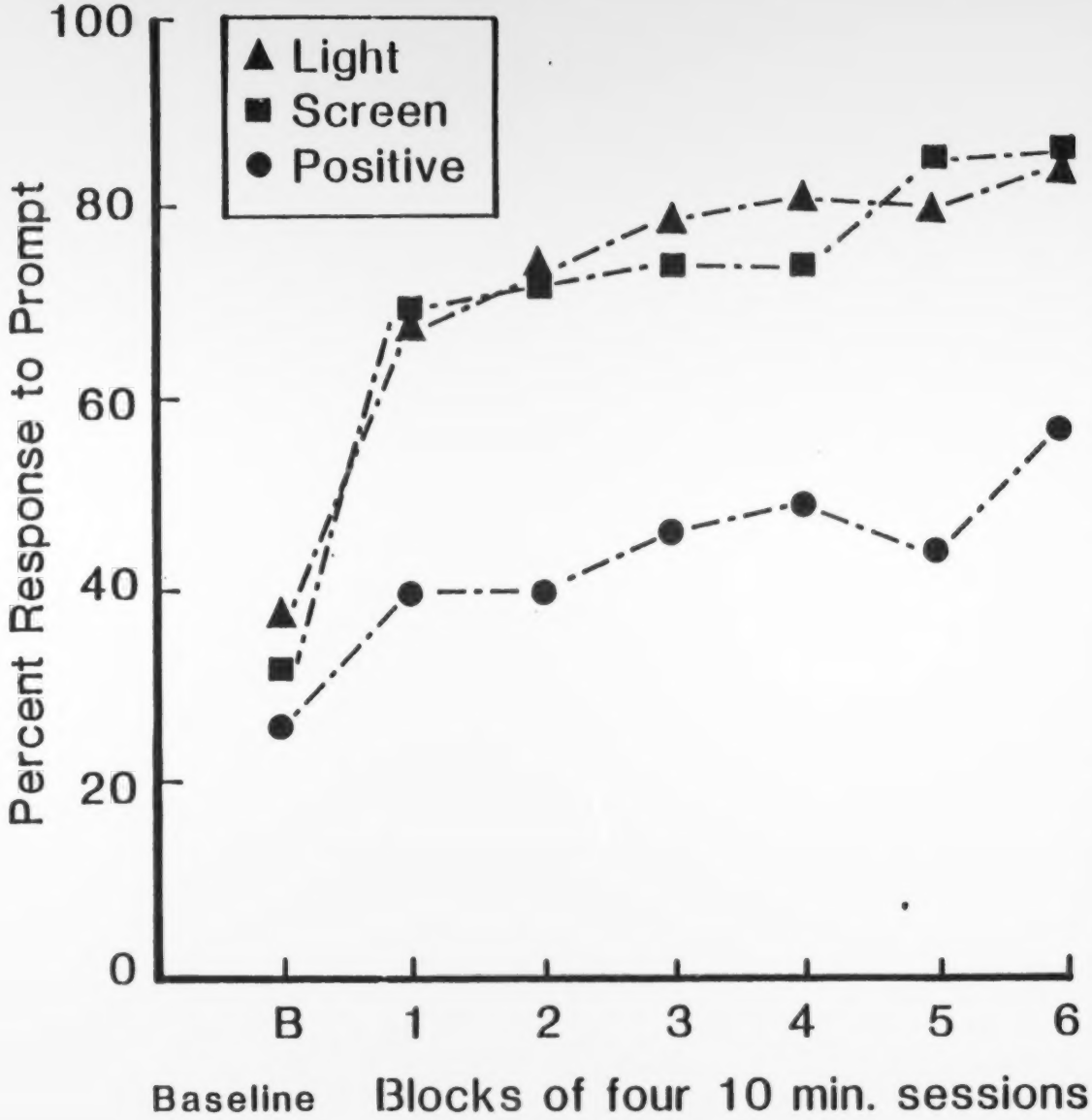

Figure 1.
Percentage response to therapist prompt
Each point represents the average
of four ten minute sessions .

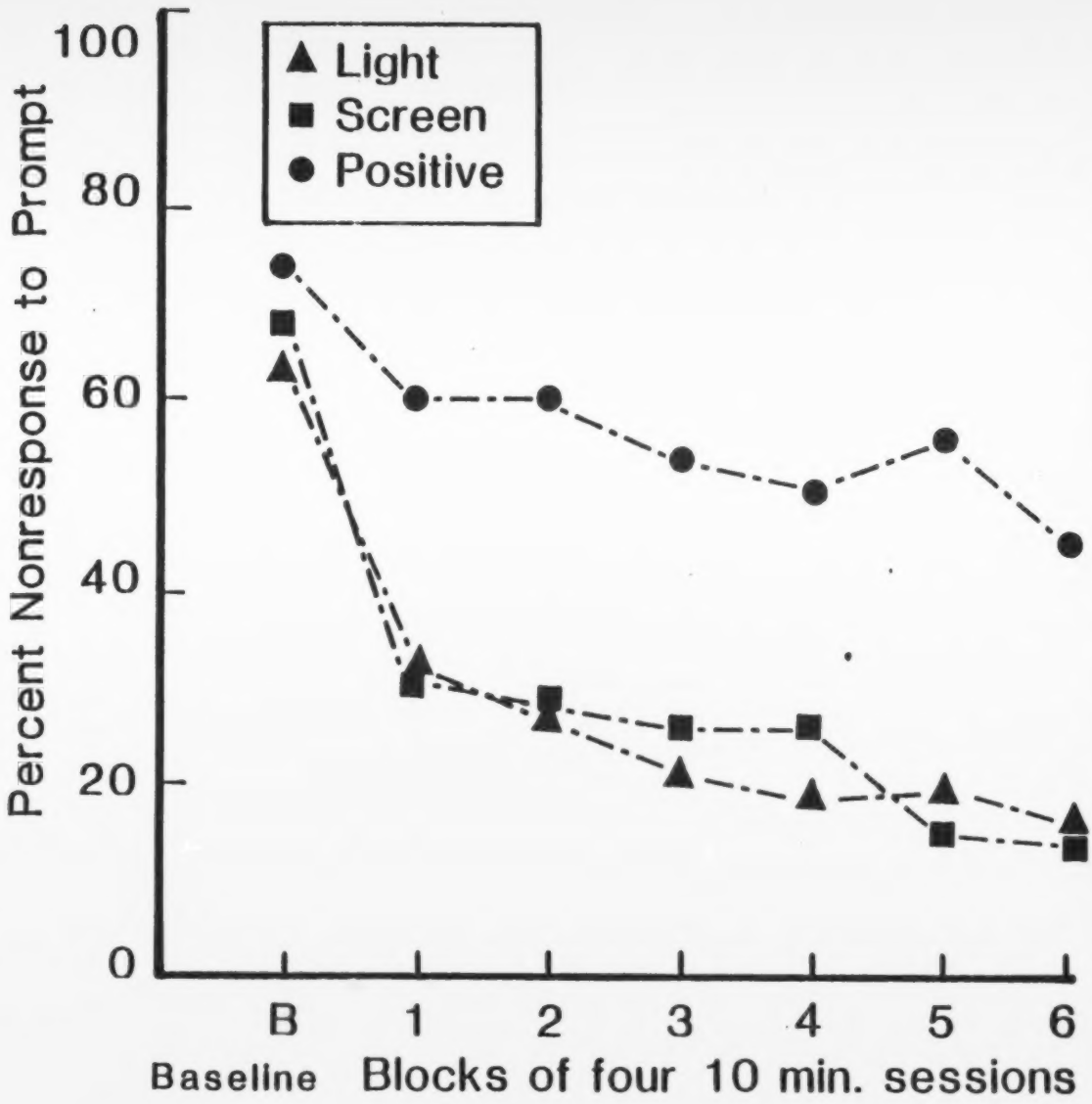

Figure 2.

Percent of nonresponses to therapist prompt

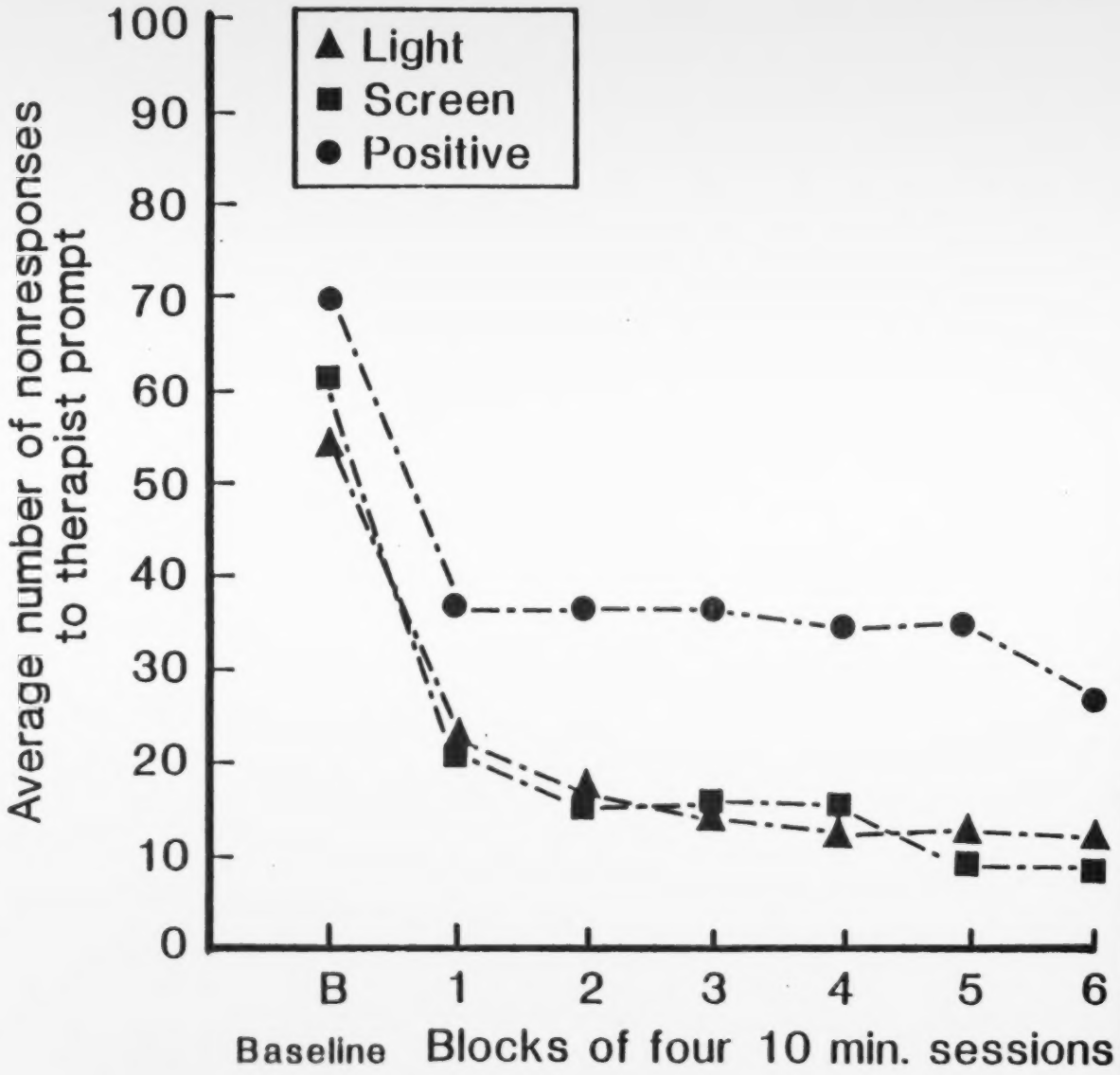

Figure 3.
Average number of nonresponses
to therapist prompt

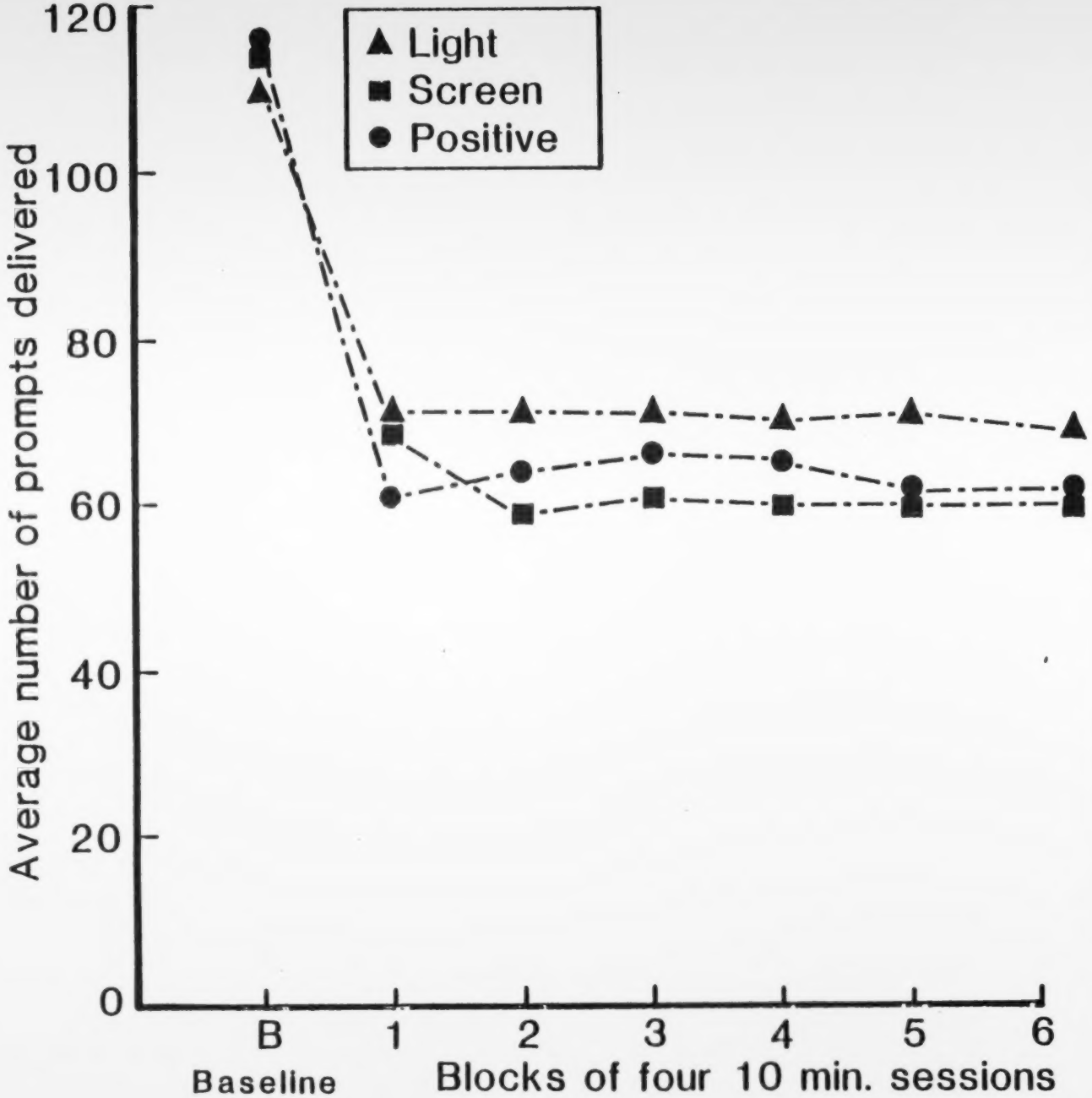

Figure 4.
Average number of prompts delivered by therapist

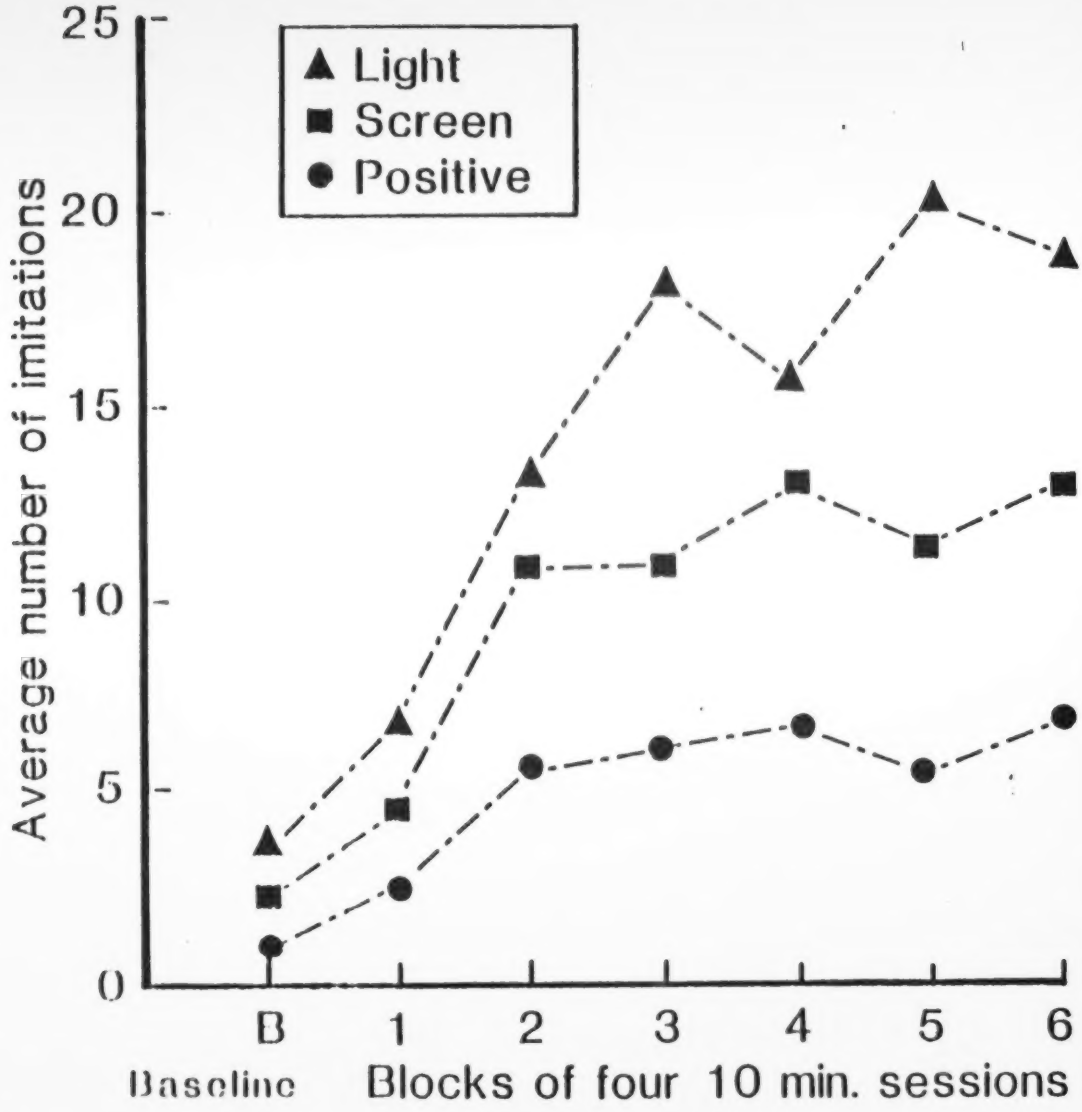

Figure 5.
Number of correct imitations to therapist prompt.